EUPHORBIA SPECIES FROM THE FLORA ZAMBESIACA AREA III.

L. C. LEACH

(With Plates XXVI–XXVII)

Euphorbia fortissima Leach, sp. nov.

E. cooperi N.E. Brown affinis sed ramis persistentibus et pauciore angulatis (3–4), pedunculis, ramis cymarum et pedicellis longioribus, capsula maxime grandiore ex involucro multo exserta et glandulis concavis reniformibus differt.

Arbor candelabriformis succulenta spinosa, c. 5 m. (7 m.) alta, trunco crasso, c. 22·5 cm. (30 cm.) diam., ramis numerosis persistentibus patenti-ascendentibus, alatis, ad medium rare ramificis, ad apicem saepe perbreviter parce ramulosis. *Rami* usque 5 m. longi, 3—4 (plerumque 3) alatis, in segmenta constricti, segmentis 4·5—9 cm. latis, 3—10cm. longis versus apicem ramorum, usque 20 cm. longis ad basem, subcircularis vel late ovatis vel rariter late ellipticis, apicibus obtusis emarginatis; alae crassae, marginibus continuis corneis 3—8 mm. latis, pallide brunneis, demum griseis, spinis binis fortibus divergentibus 2—7 mm. (10 mm.) longis armatis; rami secundarii et ramuli ex marginibus alarum producti; ramuli erecti 3—5 alatis. *Folia* exigua sessilia ovata acuta caduca, cicatricibus inconspicuis. *Inflorescentia* cymosa; cymae 1—3, pedunculatae, cyathiis 3, verticaliter dispositis, c. 5 mm. supra spinas productae; pedunculus 7—10 mm. longus usque 5 mm. crassus, bibracteatus; bracteae plerumque patulae, plus minusve late ovatae, plerumque aliquantum scissae, margine minute denticulato, c. 7 mm. latae, 6 mm. longae; cyathium medium masculinum deciduum; cyathia lateralia bisexualia, ramis cymarum 5—8 mm. longis usque 4·5 mm. crassis; bracteae plus minusve transverse latissime ellipticae obtuse carinatae, aliquantum scissae, c. 7·5 mm. latae, 5 mm. longae, margine minute denticulato. *Involucrum* crateriforme glabrum, 4—5 mm. longum, 10—11 mm. diam. glandulis inclusis; lobis 5, erectis breviter fimbriatis subquadratis leviter carinatis c. 3 mm. latis; glandulae 5, patentes reniformes integrae valde contiguae leviter concavae marginibus perbreviter erectis, minute rugulosae flavae, c. 5 mm. latae, 2·5 mm. longae. *Flores masculi* numerosi (c. 60) 5-fasciculati, bracteolis fimbriatis; pedicelli 4·5 mm. longi; filamenta c. 1·5 mm. longa; bracteae fasciculares fimbriatae laceratae. *Ovarium* anguste obovoideum stipitatum, ex involucro mox exsertum, perianthio trilobato lobis

dentatis. *Styli* patuli, c. 2·25 mm. longi, libri fere ad basem vel partim in columnam connati, apicibus crassis rugulosis emarginatis. *Capsula* trilobata obtuse triangularis, apice et basi truncato, 18—24 mm. diam., 9—10·5 mm. alta, ex involucro exserta, pedicello crasso 11—13 mm. (ad 17·5 mm.) longo, perianthio irregulariter deltato dentato. *Semen* subglobosum, c. 4 mm. longum, 3·5 mm. diam. laeve.

Type: *L. C. Leach* 11616 (BM: BRLU: COI: FHO: G: K: LISC: MO: PRE: SRGH, holotype).

S. RHODESIA. Wankie Distr.: Deka Riv., ± 10 miles S of junction with Zambesi Riv., fr. 26. iv. 1959, *L. C. Leach* 8963 (PRE: SRGH); Lutope-Gwaai Riv. junction, in *Euphorbia-Combretum* thicket, 15 foot tall, main trunk short, fl. 26. ii. 1963, *H. Wild* 6022 (G: K: SRGH); Shashachunga Riv. near junction with Deka Riv., open *Colophospermum mopane—Commiphora* savanna, alt. ± 2,350′, approx. 26° 29′ E, 18° 15′ S, fr. 30. iii. 1963, *L. C. Leach* 11616 (BM: BRLU: COI: FHO: G: K: LISC: MO: PRE: SRGH); ibid., fl. 6. iii. 1964 *L. C. Leach* 12117 (BM: BRLU: G: K: LISC: PRE: SRGH); Deka—Zambezi Riv. junction, alt. ± 2,200′, fr. 31. iii. 1963, *L. C. Leach* 11625 (G: K: PRE); Nashome, ± 17 miles W of Wankie, steep stony hillside, alt. ± 2,300′, fr. 31. iii. 1963, *L. C. Leach* 11626 (K: PRE); ibid., fl. 27. ii. 1964, *R. B. Drummond* 8441 (SRGH); Lukosi Riv., ± 10 miles S of Wankie, steep rocky hillside, fr. 7. iii. 1964, *L. C. Leach* 12124 (BM: SRGH).

(Note: flowering material *L. C. Leach* 12117 was used to complete the description of the inflorescence.)

N. RHODESIA. Gwembe Distr.: Sinazongwe, Karroo sandstone, in *Mopane-Commiphora-Combretum* association, alt. ± 1,650′, fl. & fr. 10. vi. 1963, *W. R. Bainbridge* 836 (SRGH); Livingstone Distr.: Candelabra Pool, near 5th. Gorge, below Victoria Falls, on basalt rocks, fl. & fr. 7. iii. 1964, *L. C. Leach* 12121 (K: LISC: PRE: SRGH).

E. fortissima appears to be most closely related to *E cooperi*, particularly to the more southerly forms of that species, there are however, marked and important differences in the inflorescence with its long peduncles and cyme branches and its very much larger capsule far exserted on a stout pedicel; the total length of the cyme sometimes reaches 4 cm., very different from the subsessile cymes and very shortly exserted capsules of *E. cooperi*.

The stoutly winged, dark green branches of the new species have fewer angles (3 predominating) than do those of *E. cooperi*, while due to their persistent nature, a nude trunk of any appreciable height is a rarity; the lower branches attain a length of 4—5 m. with 35—40 segments, the diameter of the plants then frequently exceeding their height, Plate I, fig. 2.

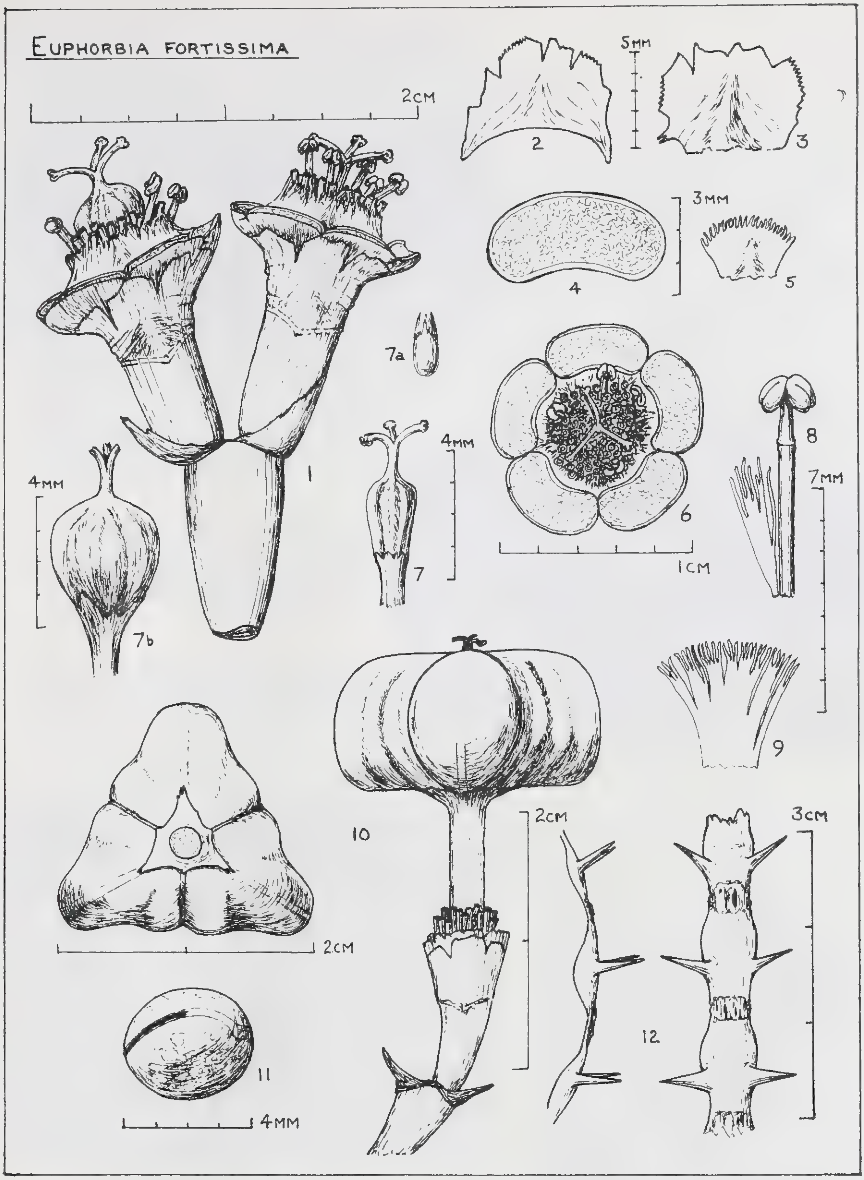


FIG. 1. *E. fortissima* Leach

(1) Pedunculate cyme.
(2) Peduncular bract.
(3) Involucral bract.
(4) Gland.
(5) Lobe.
(6) Involucre.
(7) Ovary and ovule.
(8) Staminate flower and bracteole.
(9) Fascicular bract.
(10) Capsule.
(11) Seed.
(12) Wing margin with spines.

The exceptional tree which gave rise to the name "Candelabra Pool" at the Victoria Falls has developed a nude trunk 3 m. or more in height, see Plate I, fig. 4, and it is thought that it must be of very considerable age (5 year old seedlings have shewn no inclination to produce branches). Communities seldom consist of more than a dozen individuals and despite several rather exhaustive searches, no juveniles (apart from one or two seen at the Candelabra Pool) have been found. The scarcity of seedlings is in no way caused by poor viability (small quantities of seed collected in 1959 and 1963 gave almost 100% germination) but is probably due to the fact that the ripe seed is produced towards the end of the rains, giving the maximum opportunity for mortality from various causes (*Euphorbia* seeds seem to be very much relished by the doves!) before the next season; communities of *E. angularis* Kl. in the vicinity, with fruits ripening very much later, usually consist of dense stands of plants of all ages together with numerous juveniles.

E. fortissima seems in some ways to provide a link between *E. cooperi* and *E. ingens* Meyer: the persistent branches with rather subcircular segments and stout wings which become obsolescent towards the base, the pedunculate cymes and the subglobose young fruits all remind one quite strongly of the latter species.

The distribution of the species appears to be in the vicinity of the Zambesi River and its tributaries, from immediately below the Victoria Falls to as far down as Sinazongwe on Lake Kariba: it seems worthy of note that the ubiquitous *E. ingens* is rather rare in this area.

Plant: a candelabriform, succulent, spiny, small tree c. 5 m. high (7 m.) with a short stout trunk c. 22·5 cm (30 cm.) diam. and numerous spreading ascending, persistent, winged branches which are simple or occasionally rebranched from about the middle, usually much exceeding the central trunk and often bearing 1—3 very short erect terminal branchlets. *Branches* 3—4 winged (usually 3), up to 5 m. long, constricted into 35—40 subcircular, broadly ovate or elliptic segments which are 4·5—9 cm. wide, 3—10 cm. long towards the obtuse emarginate apex of the branches, lengthening towards the base to up to 20 cm. long with the wings becoming obsolescent; the stout wing-like angles are provided with a broad continuous more or less even, pale brown (grey with age) horny margin 3—8 mm. wide, armed with strong, diverging, paired spines 2—7 mm. long (10 mm.); secondary branchlets and terminal branchlets are produced from the margins of the wings at the broadest part of the segments; terminal branchlets erect, 3—5 winged, usually very short. *Leaves* minute, sessile, ovate acute, very fleeting, leaving very inconspicuous scars shortly above the spine pairs. *Inflorescense* cymose; pedunculate cymes 1—3, each with 3 cyathia, produced from the flowering eye c. 5 mm. above the spine pairs; peduncle bibracteate, 7—10 mm. long, up to 5 mm. thick, somewhat laterally compressed; bracts usually

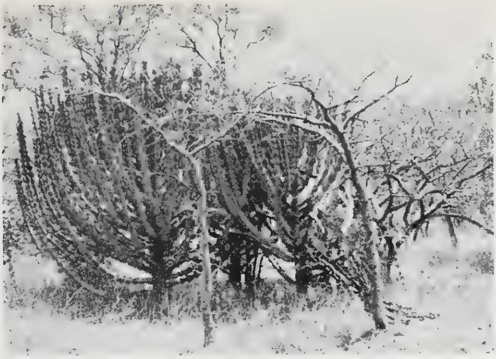
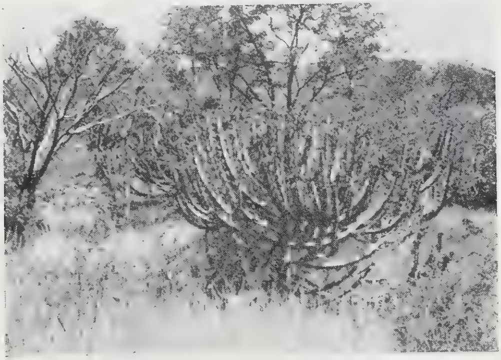


Fig. 1. Typical plants at the type locality near Wankie, S. Rhodesia.

Fig. 2. Tree with very spreading branches at the type locality.



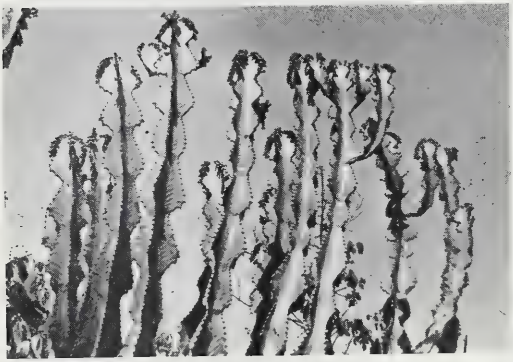


Fig. 3. Apical portion of branches, shewing segments.

Fig. 4. Tree with exceptionally tall nude trunk at the Candelabra Pool, Victoria Falls, N. Rhodesia.

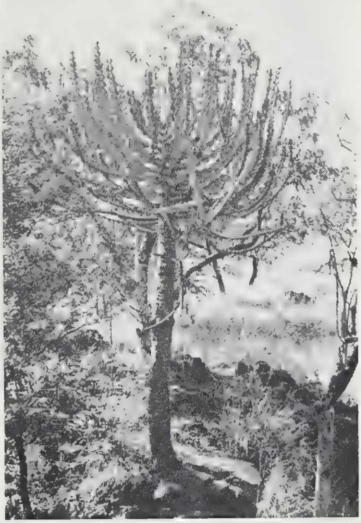


PLATE XXVI. *Euphorbia fortissima* Leach

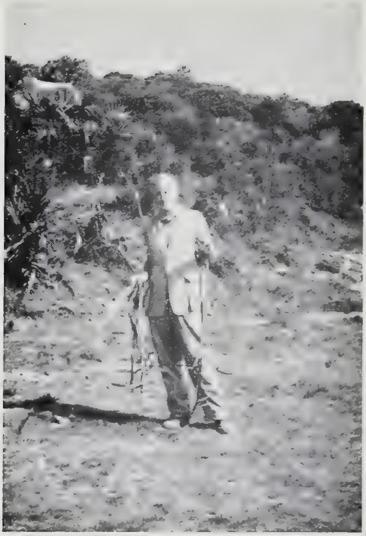


Fig. 1. Col. R. D. A. Bayliss with plants of *E. baylissii* with the type locality in background.

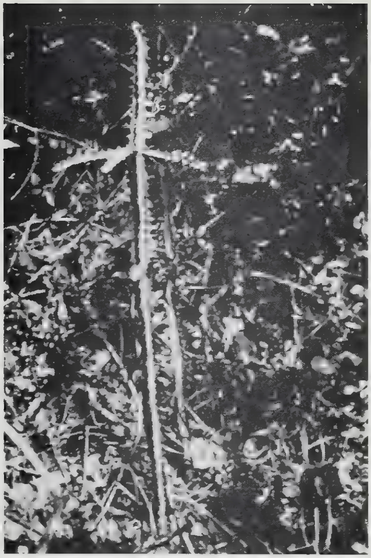


Fig. 2. Plant in heavy shade of natural habitat.

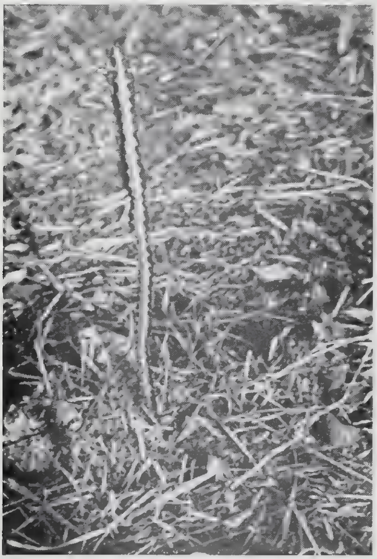


Fig. 3. Typically marked young plant in flower (removed from habitat for photograph).

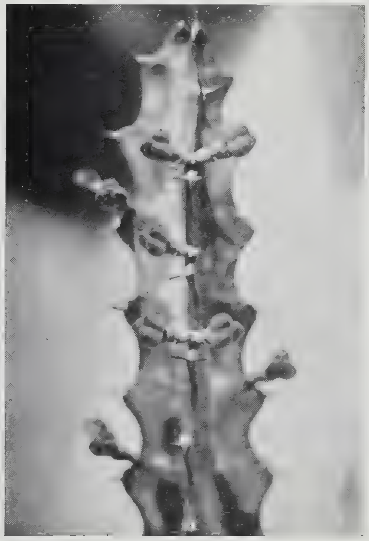


Fig. 4. Apex of stem, in fruit.

PLATE XXVII. *Euphorbia baylissii* Leach

spreading, more or less broadly ovate, usually somewhat split, with a minutely denticulate margin; the 3 cyathia of each cyme are arranged in a plane parallel with the axis of the branch; the central cyathium male deciduous; the lateral bisexual cyathia are borne on stout cyme branches which are 5—8 mm. long and up to 4·5 mm. thick; bracts more or less transversely very broadly elliptic, obtusely keeled, usually with the minutely denticulate margin split, c. 7·5 mm. wide, 5 mm. long. *Involucre* cup-shaped, glabrous, 4—5 mm. long, 10—11 mm. diam. including the glands, with 5 erect, shortly fimbriate, subquadrate, slightly keeled lobes c. 3 mm. wide; glands spreading, reniform, entire, closely contiguous, slightly concave with the margins shortly erect, minutely rugulose, yellow, c. 5 mm. wide, 2·5 mm. long. *Male flowers* numerous (c. 60) with fimbriate bracteoles, arranged in 5 bracteate fascicles with fimbriate lacerate bracts; pedicels 4·5 mm. long; filaments c. 1·5 mm. long. *Ovary* narrowly obovoid, stipitate, with a 3 lobed dentate perianth, very soon exserted from the involucre; ovule suspended under a minutely denticulate, 2 lobed fleshy hood. *Styles* spreading, c. 2·25 mm. long, free almost to the base or partly united into a column for up to half their length, with thickened emarginate rugulose apices. *Capsule* 3-lobed, obtusely triangular (becoming deeply 3-lobed immediately before dehiscence) truncate at both the apex and the base, 18—24 mm. diam., 9—10·5 mm. high, held erect on a stout pedicel 11—13 mm. (17 mm.) long with an irregularly deltate dentate perianth. *Seed* subglobose, c. 4 mm. long, 3·5 mm. diam., smooth, olive green shading to dark olive brown, partially and patchily covered with a waxy crystalline appearing white coating which imparts a variably mottled appearance, suture dark brown.

Euphorbia baylissii Leach, sp. nov.

E. ambroseae Leach affinis sed podariis vix decurrentibus haud confluentibus, spinis binis armatis, angulis alatis sinuato-dentatis, foliis multo minoribus, stylis brevioribus, ramis cymarum et pedicellis longioribus facile distinguenda.

Frutex succulentus spinosus, ·8 (perrariter ad 1·8 m.) altus, superne parce ramosus, caule plerumque uno. *Caulis* et *rami* interdum leviter constricti, angulis 4, prominenter sinuato-dentatis valde alatis; alae tenuissimae, ad 1·2 cm. latae dentibus exclusis; dentes plus minusve triangulares vel truncati, ad 4·5 mm. alti, 8—17 mm. distantes. *Rami* et *ramuli* horizontaliter patuli vel ascendentes, ex constrictionibus vel ex marginibus alarum producti; rami plerumque c. 1·5 cm. crassi. *Podaria* plus minusve obovata vix decurrentia haud confluentia, spinis binis acicularibus patulis divergentibus, 1·5—4·5 mm. longis armata. *Folia* exigua sessilia ovata acuta mox decidua; cicatrices foliorum inconspicuae spinulis binis minutis praeditae. *Inflorescentia* cymosa axillaris subsessilis vel perbreviter pedunculata, 1—3·5 mm. supra podaria producta, cyathiis 3

horizontaliter dispositis; cyathium medium plerumque masculinum deciduum interdum bisexuale; cyathia lateralia semper bisexualia. Pedunculus bibracteatus, c. 1·5 mm. longus, 2 mm. crassus; bracteae plus minusve transverse late oblongae obtusae vel truncatae, emarginatae vel subintegrae, ramis cymarum 2·5—3 mm. longis, bracteis subquadratis obtusis. *Involucrum* latissime infundibuliforme, 5·5—6 mm. diam., c. 2·5 mm. longum, glabrum, lobis 5 imbricatis, transverse ellipticis, irregulariter denticulatis; glandulae 5, transverse oblongae, c. 3 mm. latae, patulae, valde contiguae, leviter concavae, rugulosae luridae. *Flores musculini* 15, 5-fasciculati, bracteolis filiformibus fimbriatis; bracteae fasciculares oblongae laceratae fimbriatae. *Ovarium* glabrum, obtuse trigonum, ex involucro partim exsertum; styli patuli, libri e basi, c. 1·25 mm. longi, apictbus paulo crassis subcapitatis rugulosis. *Capsula* trilobata, 3·5—4 mm. longa 4·5—5·5 mm. diam., denique perbreviter exserta ex involucro pedicello crasso c. 3 mm. longo. *Semen* subglobosum, c. 2 mm. longum, pallide brunneum, verrucosum.

Type: *L. C. Leach & R. D. A. Bayliss* 11796 (BM: BRLU: COI: G: K: LISC: LMJ: MO: PRE: SRGH, holotype).

MOZAMBIQUE. Sol do Save: c. 15 km. N of Manjacaze, "mata de M'crusse de Santos Gil", fr. 3. xii. 1942, *F. A. Mendonça* 1576 (LISC); Ponta Zavora, 24° 31′ S, 35° 12′ E, in heavy shade of evergreen scrub on coastal sand dunes, fl. & fr. 3. x. 1963, *L. C. Leach & R. D. A. Bayliss* 11796 (BM: BRLU: COI: G: K: LISC: LMJ: MO: PRE: SRGH); Miramar, ± 15 miles NE of Inhambane, on sand dunes in shade of coastal scrub, fl. & fr. 4. x. 1963, *L. C. Leach & R. D. A. Bayliss* 11798 (BM: BRLU: COI: G: K: LISC: MO: PRE: SRGH); ibid., complete juvenile plants (G: K: LISC: PRE: SRGH).

E. baylissii is a shade-loving plant of the coastal sand dunes of the Sol do Save region of Moçambique; the distribution, as at present known, lying between Inhambane and Manjacaze. Plants are found only on the white sand dunes and in the heavy shade of evergreen scrub; the plant from Manjacaze, although with its habitat some little distance from the coast, enjoys virtually identical conditions inasmuch as the "mata de M'crusse de Santos Gil" has "soil (recent white sands) and an ecology akin to those of the littoral dunes" while "M'crusse is the vernacular name of *Androstachys johnsonii* Prain, an evergreen gregarious tree living in patches of closed and shadowy forest never far from the sea".

The new species appears to have a very extended flowering period; plants collected when in bud and in fruit (frequently at all stages on the same plant) in October 1963 and placed in cultivation at Nelspruit, Transvaal and at Salisbury, S. Rhodesia were still flowering in March 1964.

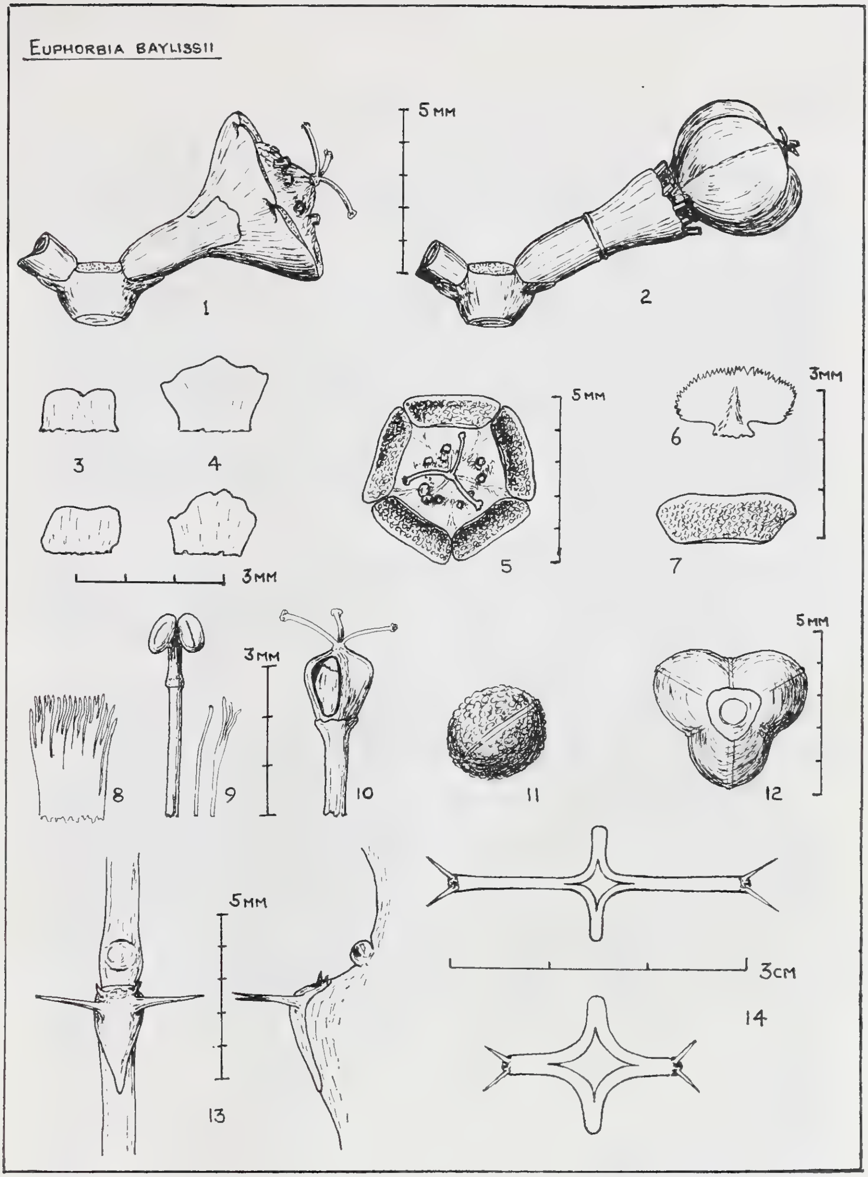


FIG. 2. *E. baylissii* Leach

(1) Lateral cyathium.
(2) Lateral cyathium with capsule.
(3) Peduncular bracts.
(4) Involucral bracts.
(5) Involucre.
(6) Involucral lobe.
(7) Gland.
(8) Internal fascicular bract.
(9) Staminate flower with bracteoles.
(10) Ovary.
(11) Seed.
(12) Capsule.
(13) Spines and spine shield.
(14) Sections of stem and branch.

It is with great pleasure that this species is named after Col. R. D. A. Bayliss who has collected widely in E and Southern Africa and who found the Ponta Zavora plants whilst on a collecting trip in the Sol do Save region of Mocambique.

E. baylissii is most closely related to *E. ambroseae*, (which also inhabits the coastal plain of Moçambique about 200 miles to the North) but is a smaller plant, very seldom exceeding 1 m. in height, often reduced to a single unbranched stem and is readily distinguished by its armed obovate spine shields which are scarcely or not at all decurrent and by its winged and toothed angles which are very different from those of the practically unarmed *E. ambroseae;* there are also affinities with the numerous group of closely related shrubs which includes such species as *E. quadrangularis* Pax, *E. lydenburgensis* Schweickerdt & Letty, *E. complexa* R. A. Dyer and the dwarf *E. schinzii* Pax, all of which have important characters in common.

Plant an erect succulent spiny shrub, ·8 m. (exceptionally up to 1·8 m.) high, usually single stemmed, sparingly branched and very sparingly rebranched above. *Stems* and *branches* constricted at intervals (usually distant) with 4 prominently sinuate toothed wing-like angles and a very small central core, usually very distinctly marked with dark green towards the margins with the longitudinal "stripe" almost white; wings up to 1·2 cm. wide excluding the teeth, c. 1 mm. or less thick (the wings sometimes becoming obsolescent and the stem subterete sublignose towards the base, up to 2·25 cm. diam.); teeth ± deltoid or with the upper slope truncate, up to 4·5 mm. high, 8—17 mm. apart along the angles. *Branches* and *branchlets* horizontally spreading or ascending, produced from the constrictions or from the margins of the wings very shortly above the constrictions, generally c. 1·5 cm. diam. *Spine shields* at the apex of the teeth, obovate, acute below but not at all or only very slightly decurrent, pale brown, armed with a pair of spreading diverging needle-like brown spines, 1·5—4·5 mm. long with a pair of minute prickles on either side of the inconspicuous leaf scar. *Leaves* sessile, minute, very soon deciduous, ovate acute, up to 1·5 mm. long. *Inflorescence* an axillary, subsessile or very shortly pedunculate cyme of 3 cyathia arranged in a plane at right angles to the axis of the branch, produced from the flowering eye in the axils of the teeth, 1—3·5 mm. above the spine shields; the central primary cyathium usually male deciduous, sometimes bisexual; the lateral cyathia borne on widely diverging cyme branches, are always bisexual. *Peduncle* bibracteate, c. 1·5 mm. long, 2 mm. thick; bracts transversely broadly oblong, obtuse or truncate, emarginate or subentire; cyme branches 2·5—3 mm. long, c. 1·5 mm. diam.; bracts subquadrate obtuse, obscurely crenulate or subentire. *Involucre* very shallowly funnel shaped, 5·5—6 mm. diam. c. 2·5 mm. long, glabrous, pale creamy yellow flushed purple;

glands 5, transversely oblong, c. 3 mm. wide, 1 mm. long, spreading, very closely contiguous, shallowly concave with the inner margin slightly raised, minutely rugulose, the slightly thickened outer margin smooth and somewhat translucent; lobes 5, overlapping, transversely elliptic, c. 2·5 mm. wide, irregularly denticulate with a slightly fleshy keel, white flushed pink. *Staminate flowers* each with a fimbriate bracteole, arranged in 5 bracteate fascicles each of 3 flowers; bracts oblong fimbriate lacerate, c. 2·5 mm. long. *Pistillate flower* glabrous, ovary raised on a short stout pedicel with a rudimentary obtusely triangular perianth very soon partially exserted from the involucre, obtusely trigonous with the sutures and angles clearly marked, rose pink at the apex; styles free to the base, spreading, c. 1·25 mm. long, pale terracotta, with slightly thickened subcapitate rugulose bright terracotta tips; ovule filling the cell under a minute hood. *Capsule* 3-lobed, 3·5—4 mm. long, 4·5—5·5 mm. diam., very shortly exserted from the involucre on a pedicel 2·5—3 mm. long, dark purplish red at the apex and down the sutures and angles. *Seed* subglobose c. 2 mm. long, pale brown, more or less densely covered with pale coloured verrucae, suture raised with a narrow dark brown line on either side.

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